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FEDERAL R&D FUNDING BY BUDGET FUNCTION:

FISCAL YEARS 1978-80

Division of Science Resources Studies
National Science Foundation

April 1979

Note: Detail in tables may not add to totals because of rounding. Percent and dollar increases and decreases are based on unrounded numbers and may not conform exactly to amounts shown in tables.

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NOTE

This report is based on R&D budget authority data provided to OMB by the agencies as background for *Special Analysis L: Research and Development* in the 1980 budget. Further detailed program information is based on budget justification documents of the leading R&D support agencies and information provided directly to NSF by some of the smaller agencies. The assumed inflation rate for 1980 of 7 percent to 8 percent is based on estimates shown in *The Budget of the United States Government, Fiscal Year 1980*.

Function categories and definitions are the same as those used in *The Budget* with one exception. The budget function of *general science, space, and technology* has been divided into two functions in this analysis: *space research and technology* and *general science and basic research*.

General science and basic research is a function heading that encompasses R&D programs that are intended to support the Nation's scientific base directly. Most programs under this heading are basic research in character. They include all NSF R&D programs and a major portion of the DOE basic research program. Most Federal basic research funds, however--75 percent of the total in 1980--are allocated to other budget functions since they support other national needs or missions, such as defense, health, or energy. *Basic research: all functions* includes the basic research programs of all Federal agencies, those basic research programs that are subsumed within the general science and basic research function as well as those basic research programs that are subsumed within other, mission-related functions.

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PREFACE

Within the overall Federal budget there is no R&D budget as such nor are most appropriations made for research and development as such except in the case of certain program areas in defense, space, and energy. In order to reach an overall Federal R&D figure for purposes of analysis the R&D programs of individual agencies have to be selected from agency budgets, sometimes in the form of line items and sometimes as sections under line items, and compiled into broader totals.

Each year one of the special analyses of the Federal budget provides R&D budget data through reporting requirements placed on the agencies at the time of budget preparation. This analysis provides a view of the R&D portion of the budget in broad totals: basic research, applied research, and development, and support to universities and colleges, as well as providing general descriptions of the R&D programs of the larger support agencies. The broad outlines of administration policy are, thus, set forth at the time of the President's budget message.

The next step in the budgetary process is the presentation of detailed program requests by the agencies to congressional committees, followed by a lengthy series of legislative authorization and appropriaction actions. Those who take part in or follow this process need an R&D program array to serve as the basis for decisionmaking as well as for tracking subsequent actions taken by the Congress and the executive branch.

This report helps to answer that need by providing a view of the entire R&D portion of the Federal budget in the form of a series of tables accompanied by brief descriptions and arranged according to budget functions. The budget reflects designated national needs in terms of 16 functional areas. Funding for those areas plus interest on the national debt make up the budget total with no overlap occurring between the functions or the agency programs within the functions. An immediate comparison is thus possible of the relative emphases given to various areas of Federal responsibility. By categorizing R&D funding data by these same budget functions the ratio of R&D funding to total Federal funding within each function can be viewed as one measure of the role assigned to research and development in meeting the needs embodied in the functions. By another comparison, the amounts of R&D funding for functions, shown together, provide a measure of relative R&D emphases and an indication of the kinds of resources within the "R&D-producing" sectors of the economy that are likely to be called upon.

This report is a display rather than an analysis. It is based on the detailed program justification documents of the leading R&D support agencies plus data provided to the Office of Management and Budget (OMB) by the smaller agencies. Programs are identified by agency and presented in considerable detail. The text has been kept brief with the intention that the tables by their format will serve an analytical function. The discussion is concentrated on pointing up the chief funding changes and policy directions.

An additional table is provided in appendix A, showing budget authority for basic research, applied research, and development by function, subfunction, and agency. This table is intended as a supplement to the program data in the main body of the report.

The entire report is based on budget authority dollars rather than obligations or outlays since budget authority is the basis of congressional funding decisions. The data shown in this report agree with budget authority data supplied to OMB by the agencies as background for Special Analysis L: Research and Development. This report can be considered to be an elaboration of that data.

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Appendix A:

Budget Authority for Basic Research, Applied Research, and Development by Function and Agency 75

RESEARCH AND DEVELOPMENT IN THE 1980 FEDERAL BUDGET

Total budget authority for R&D programs in the 1980 budget is $30,629 million, or 4 percent more than the $29,451 million estimated for 1979. This growth is considerably lower than the 10 percent growth shown for the Federal budget as a whole.

In the 1980 budget R&D budget authority represents 5.5 percent of the total (excluding interest) compared with 5.8 percent in 1978 and 1979. Within individual functions, however, the R&D shares vary widely: from a fraction of 1 percent in several functions with small R&D programs to as much as 97 percent for space research and technology. 1/

Innumerable administration decisions were made as to levels of support to be provided for the various R&D programs in 1980, and the effects of these decisions include the following:

- An R&D total that shows growth of 4 percent, less than enough to meet anticipated inflation.
- An increase of 9 percent in budget authority for basic research, providing for some real growth.
- A decline of 2 percent in R&D funding for energy, including a reduction of Federal support for demonstrations of short-term technologies more appropriately undertaken by industry and with a focus on long-term breeder reactor R&D efforts other than the Clinch River demonstration, and including important increases at the same time for solar, environmental, and regulatory programs.
- A 3 percent increase for space R&D, including continued development of the space shuttle and a 14 percent increase in space science, applications, and technology.

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[1] The space research and technology function and the general science and basic research function have been broken out of the budget function of general sciences, space, and technology and made into two separate functions for purposes of a more precise analysis.

- A 2 percent increase in health R&D, including a virtual leveling off in overall biomedical research with emphasis on preventive health and population research cutting across disciplinary lines and a 19 percent increase in mental health, drug, and alcohol abuse research.

Shares of the R&D total

When R&D programs by functional areas are viewed together, it is seen that national defense R&D programs account for an estimated 49 percent of the Federal R&D total in 1980. The other 51 percent is largely taken up with five functions: Space research and technology--13 percent of the total; health--11 percent; energy--11 percent; general science and basic research--4 percent; and natural resources and environment--3 percent. The remaining 10 functions account for less than 8 percent of all R&D budget authority in 1980.

Rates of Change

Among the six leading functions--all those with R&D budget authority of more than $1 billion in 1980--general science and basic research is the only one to show growth that will exceed anticipated inflation. The 11 percent gain of this function compares with a 6 percent gain for national defense and a 6 percent gain for natural resources and environment. Gains for health and space are on the order of 2 percent to 3 percent. Energy reflects an absolute decline. Since these functions represent more than nine out of 10 R&D dollars, their effect on the Federal total is decisive.

Budget authority for research and development by function[a]

[Dollars in millions]

	1978 Actual	1979 Estimate	1980 Estimate	Change 1979-80	
				Dollars	Percent
Total	$26,480	$29,451	$30,629	+$1,178	+ 4.0%
National defense	12,899	14,284	15,117	+ 833	+ 5.8
Space research and technology	3,481	3,944	4,051	+ 107	+ 2.7
Health	2,968	3,387	3,444	+ 57	+ 1.7
Energy	3,134	3,485	3,429	- 57	- 1.6
General science and basic research	1,050	1,128	1,248	+ 119	+10.6
Natural resources and environment	898	994	1,054	+ 60	+ 6.0
Transportation	767	822	862	+ 41	+ 4.9
Agriculture	501	555	559	+ 4	+ 0.7
Education, training, employment, and social services	344	345	350	+ 5	+ 1.4
Veterans benefits	111	123	123	-	-
International affairs	54	75	100	+ 25	+33.3
Community and regional development	91	113	94	- 19	-16.8
Commerce and housing credit	76	90	87	- 3	- 3.3
Administration of justice	44	46	49	+ 3	+ 6.5
Income security	43	41	44	+ 2	+ 7.3
General government	18	18	19	+ 1	+11.1

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[a] Listed in descending order of 1980 R&D budget authority. One budget function--general science, space, and technology--has been divided into two functions in this analysis: space research and technology, and general science and basic research.

NATIONAL DEFENSE

The national defense function accounts for 24 percent of all budget authority requested in the 1980 budget, but the R&D portion of the national defense function accounts for 49 percent of the total R&D budget authority. Ratios approximate to these have prevailed for a number of years.

Total R&D budget authority requested for this function in 1980 is $15,117 million, or 6 percent more than the 1979 level of $14,284 million (including a $523 million supplemental appropriation request not yet acted upon by the Congress). Two agencies--the Department of Defense (DOD) and the Department of Energy (DOE)--sponsor all the R&D activities within this functional area. Their combined R&D programs make up 11 percent of the national defense function in 1980.

The major features of the national defense R&D program for 1980 are these:

- An increase of 14 percent in budget authority for DOD technology base, with special emphasis on the portion of technology base that includes basic research.
- An increase of 24 percent in advanced technology development.
- An increase of 35 percent in DOD intelligence and communications R&D to assure capability for monitoring foreign military activities and verifying international arms control agreements.
- A leveling off in funding for DOD strategic and tactical R&D programs with many of them in later stages of development; without the 1979 supplemental request for the M-X intercontinental ballistic missile and other programs, however, the strategic program increase in 1980 would be 21 percent.
- An increase of 5 percent in DOE atomic energy defense activities, including a decrease for naval reactor development, a 61-percent increase in defense waste management, and a 23-percent increase in verification and control technology.

R&D budget authority for national defense

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$12,899	$14,284	$15,117
Department of Defense - Military	11,829	13,163	13,935
Research, development, test, and evaluation	11,395	12,699[a]	13,462
Technology base	1,799	2,028	2,312
Advanced technology development	502	513	636
Strategic programs	2,329	2,383	2,411
Tactical programs	4,644	5,311	5,251
Intelligence and communications	559	672	911
Defensewide mission support	1,562	1,794	1,942
Other DOD military	434	464	473
Atomic energy defense activities	1,069	1,121	1,182
Department of Energy	1,069	1,121	1,182
Inertial confinement fusion	105	105	109
Naval reactor development	224	272	241
Weapons R&D and testing activities	607	584	619
Verification and control technology	26	30	37
Materials production	11	10	9
Defense waste management	56	77	124
Nuclear materials security and safeguards	41	43	43
Other defense-related activities	1	-	-
Federal Preparedness Agency	1	-	-

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[a] Includes a $523 million supplemental request distributed as follows: $390 million for strategic programs, $94 million for tactical programs, $37 million for technology base, and almost $1 million for advanced technology development.

Department of Defense - Military

The DOD budget authority request makes up 92 percent of the national defense R&D total in 1980. The entire DOD program amounts to $13,935 million, or 6 percent more than the $13,163 million total in 1979. Within it the research, development, test, and evaluation (RDT&E) appropriation accounts for virtually all the funding.

An increase of $284 million, or 14 percent, in the request for technology base represents the continuation of an administration policy to assure significant support to this phase of national defense R&D activities. Work in this area provides the ideas and inventiveness that lead to new weapons systems and improvements in existing systems. Approximately one-fifth of the technology base effort is basic research, and all the rest is applied research, including a portion of the technology base total that is categorized as exploratory development. DOD plans an increase of 16 percent in budget authority for basic research in 1980.

DOD advanced technology development is scheduled for an increase of $123 million in 1980, or 24 percent.

DOD strategic programs are expected to grow by only $28 million in 1980, or 1 percent. Excluding the 1979 supplemental request, the increase would be much greater. The budget provides for the continued development of the air-launched cruise missile (ALCM), the M-X intercontinental ballistic missile, the advanced ballistic re-entry system, B-52G/H avionics modernization, the Air Force satellite communications system , the fleet ballistic missile system, the Trident submarine, and the Army BMD advanced technology and systems technology programs.

A $60 million decrease, or 1 percent, is indicated for DOD tactical programs in 1980 after three years of rapid growth. Continuing in development are the advanced attack helicopter (AAH), the Patriot (SAM-D) air defense missile system, the Pershing II, the LAMPS MK 111 helicopter, the Navy air combat fighter, the Tomahawk sea-launched cruise missile, and the NAVSTAR global positioning system.

An increase of $239 million, or 35 percent, is proposed for DOD intelligence and communications with the chief activities undertaken by the Air Force.

DOD defensewide mission support is scheduled for growth of $148 million, or 8 percent.

Atomic energy defense activities

Atomic energy defense R&D activities of $1,182 million account for 8 percent of the 1980 R&D budget authority for national defense. The net gain for this area is 5 percent. The largest program is DOE weapons R&D and testing activities, recommended for a 6-percent increase, or $35 million. Naval reactor development of DOE, the next largest program, is expected to decline by 11 percent. This $31-million drop is more than offset by a $47 million increase in DOE defense waste management, or 61 percent, making it the third largest program in 1980. DOE inertial confinement fusion, now fourth in size, will increase slightly, by $4 million.

SPACE RESEARCH AND TECHNOLOGY

Within this function all activity is conducted by the National Aeronautics and Space Administration (NASA). Total budget authority requested for NASA space research and technology in 1980 is $4,051 million, an increase of 3 percent over 1979. The 1979 estimate of $3,944 million includes a $185 million supplemental appropriation request for the space shuttle not yet approved by the Congress. In the 1980 budget the major changes are the following:

- An increase of 21 percent in basic research support from $455 million in 1979 to $551 million in 1980. Most of the basic research is found in space science, applications and technology.
- A decrease of 4 percent to $2,288 million in 1980 in space transportation systems (STS) as the space shuttle moves toward its first orbital flight in 1979 and initial operations in 1981.
- An increase of 14 percent in support for space science, applications, and space technology to $1,387 million in 1980.
- A new research initiative in agricultural research to apply remote sensing to crop production estimation, especially in foreign areas, and to quantitative early warnings of natural disasters.

Almost all the activities under space research and technology are either conduct of research and development or construction of R&D facilities. Thus, the ratio of R&D budget authority to total budget authority for this function is high--approximately 97 percent in 1980.

R&D budget authority for space research and technology

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 3,481	$ 3,944	$ 4,051
National Aeronautics and Space Administration	3,481	3,944	4,051
Space transportation systems	2,115	2,381[a]	2,288
Space science, applications, and technology	1,047	1,219	1,387
Space sciences	518	621	719
Space and terrestrial applications	339	398	460
Space research and technology	158	173	181
Energy technology	31	28	26
Supporting activities (tracking and data acquisition)	320	344	376

[a] Includes a $185 million supplemental appropriation request.

Space transporation systems (STS)

This program provides all the transportation and related capabilities required to conduct space operations. The overall proposed decrease of $93 million, or 4 percent, in 1980 reflects a decline in development of the space shuttle as it approaches completion, including, however, a partially offsetting increase for a program covering the transition to an operational shuttle transportation system.

R&D budget authority for space transportation systems

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 2,115	$ 2,381	$ 2,288
Space shuttle	1,346	1,625[a]	1,363
Design, development, test and evaluation	1,304	1,168	609
Orbiter	811	653	283
Main engine	197	161	110
External tank	88	107	60
Solid rocket boaster	105	100	57
Launch and landing	104	146	99
Production	42	457	754
Orbiter	29	343	589
Main engine	13	81	80
Launch and landing	-	12	25
Spares and equipment	-	20	60
ace flight operations	267	309	466
Space transportation systems operations capability development	65	109	128
Spacelab	22	39	59
Space transportation system upper stage	8	16	18
Multimission and payload	5	11	10

	1978 Actual	1979 Estimate	1980 Estimate
Space transportation systems operations capability development (cont'd)			
Mission Control Center (MCC) upgrading (level II)	5	13	16
Payload and operations support	25	30	11
Thrust augmentation	-	-	15
Development, test and mission support..	172	160	172
Research and test support	45	40	42
Data systems and flight support	46	46	47
Operations support	44	40	39
Launch system support	37	34	44
Advanced programs	10	7	13
Space transportation systems operations	16	33	153
Shuttle operations	15	21	114
Payload operations	2	12	39
Planning and program integration	4	(b)	(b)
Expendable launch vehicles	134	71	71
Scout	16	11	7
Centaur	41	21	18
Delta	70	39	43
Atlas F	6	-	2
Research and program management	368	376	388

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[a] Includes a $185 million supplemental request.

[b] Beginning with FY 1979 this effort is funded within the space applications program.

- The proposed decrease of $262 million, or 16 percent, in budget authority for the space shuttle in 1980 is based on approval of the $185 million supplemental appropriation request for 1979.

- The design, test and evaluation phase of the shuttle program will reflect a decrease of $558 million, or 48 percent, while the production program will increase $297 million, or 65 percent. The first orbital flight of the shuttle is planned for late 1979. NASA plans to achieve an operational capability to launch and land shuttle orbiters from the Kennedy Space Center in Florida in 1981 and from the Vandenburg Air Force Base in California in 1983.

- The proposed increase of $157 million, or 51 percent, proposed for space flight operations reflects expanded support for all major elements of this program as the STS program moves toward the operational stage.

- The drop of $20 million in 1980 for payload and operations support under STS operations capability development results from the NASA decision to discontinue plans for reboosting or deorbiting Skylab because of limited chances of success.

Funds for the purchase of expendable launch vehicles will level off in 1980 as the shuttle takes over an increasing proportion of payload launches.

Space sciences

This program utilizes space systems, supported by ground-based and airborne observations, to conduct a broad spectrum of scientific investigations. The 1980 budget provides for an increase of $98 million, or 16 percent.

R&D budget authority for space sciences

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 518	$ 621	$ 719
Physics and astronomy	224	282	337
High-energy astronomy observatories development	20	11	5
Solar maximum mission development	30	16	1
Space telescope development	36	79	113
International solar polar mission development	-	13	50
Shuttle/spacelab payload development	27	35	41
Explorer development	24	30	30
Mission operations and data analysis	19	25	36
Research and analysis	43	44	34
Suborbital programs	25	29	27
Planetary exploration	147	182	220
Pioneer Venus	18	-	-
Galileo	21	79	116
Mission operations and data analysis	64	59	59
Research and analysis	44	44	45
Life sciences	33	40	44
Life sciences flight experiments	9	12	13
Vestibular function research	2	4	4
Research and analysis	23	24	27
Research and program management	115	117	118

- Support for physics and astronomy is expected to increase by $54 million, or 19 percent, without any new space flight programs being initiated. This growth is principally for the continued development of the space telescope and the international solar polar mission, both scheduled for launch in 1983. A decrease in research and analysis results from the transfer of the upper-atmosphere research program to the space applications program.

- Funds for planetary exploration will increase an estimated $38 million, or 21 percent, in 1980. No new space flight programs will be initiated. Major emphasis and growth is planned for the Galileo mission, which encompasses direct and long-duration studies of Jupiter. Launch is scheduled by the space transportation system in 1982.

Space and terrestrial applications

This program uses space, aircraft, and ground-based systems to identify and demonstrate the useful applications of space techniques in the areas of remote sensing. The purpose is to acquire information which will assist in solution of Earth resources and environmental problems, in advanced communications satellite systems technology, and in materials processing research and experimentation. The 1980 budget provides for an increase of $62 million, or 16 percent, for support to this area.

R&D budget authority for space and terrestrial applications

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 339	$ 398	$ 460
Resource observations	103	139	141
Landsat-3	3	1	-
Landsat-D	48	97	90
Heat capacity mapping mission	1	(a)	-
Magnetic field satellite	11	4	2
Shuttle/spacelab payload development..	4	6	2
Extended mission operations	(a)	(a)	1
Geodynamics	7	8	13
Applied research and data analysis ...	30	22	34
Environmental applications	75	68	117
Tiros-N	4	1	-
Nimbus-7	12	4	1
Seasat	14	4	-
Earth radiation budget experiment	-	7	23
Halogen occulation experiment	-	4	8
Stratospheric aerosol and gas experiment	2	-	-
Shuttle/spacelab payload development..	6	8	7
Operational satellite improvement program	6	6	7
Applied research and data analysis ...	29	34	50
Extended mission operations	1	1	6
Upper atmospheric research	(12)[b]	(14)[b]	15
Applications systems	13	16	24
Technology transfer	10	11	10
Materials processing in space	14	20	20
Space communications	19	21	19
Technology utilization program	9	9	12
Research and program management	95	114	117

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[a] Less than $500,000

[b] Program transferred from space science to space applications in 1980; fiscal years 1978 and 1979 funding not included in total.

- Little overall change in resource observations is expected in 1980. Major emphasis will be on development of Landsat-D, although a small decrease is proposed for 1980. Landsat-D, scheduled for launch in 1981, will provide imagery with the improved spectral and spatial resolution needed to expand the use of space data for agricultural, water resource, and other applications.

- The increase of $12 million proposed for applied research and data analysis reflects a proposed initiative in agricultural monitoring. This will be a joint undertaking of the Department of Agriculture, the National Oceanic and Atmospheric Administration within the Department of Commerce, the Agency for International Development, the Department of the Interior, and NASA. The objective is to extend the application of aerospace technology to crop production estimation, especially in foreign areas, and to provide quantitative early warning capabilities.

- A sharp rise of $49 million, or 72 percent is proposed for environmental applications in 1980. However, $15 million of this figure results from the transfer of the upper atmospheric research program from space sciences.

- An increase of $16 million is proposed for the continued development of an earth radiation budget satellite system as part of the administration's climate research program. The system is scheduled for launch by the shuttle in 1982 and 1983.

- The increase of $16 million in 1980 for applied research and data analysis within environmental applications provides for expanded support for global weather research, including the Global Atmospheric Research Program (GARP), and work on climate, severe storms, environmental quality, and ocean processes research.

Space research and technology

The objectives of this program are to provide the technology base necessary to support current and future space activities, to formulate options for the future, and to advance approaches for further reducing the costs of space activities. The 1980 budget provides for a small increase of $9 million, or 5 percent, in support of this area.

R&D budget authority for space research and technology

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 158	$ 173	$ 181
Research and technology base	65	72	77
Materials research and technology	7	8	8
Structures research and technology	6	7	8
Sensing and detection research and technology	4	5	5
Guidance and control research and technology	4	4	4
Data reduction and distribution research and technology	7	8	10
Chemical propulsion research and technology	8	9	10
Electrical propulsion research and technology	6	7	8
Space energy systems research and technology	10	11	12
Nuclear energy systems research and technology	1	-	-
High-powered lasers and energetics research and technology	6	7	7
Entry research and technology	6	6	6
System studies	2	2	2
System technology programs	6	8	16
Experimental programs	15	17	18
Standards and practices	9	9	3
Research and program management	61	66	65

- o Greatest growth--$8 million, or 100 percent--is proposed for system technology programs. This increase is primarily for the second phase of the NASA end-to-end data systems (NEEDS) program and the initiation of system technology efforts for advanced communications satellites.
- o The decline of $6 million in the standards and practices program results from the completion of a number of standardization efforts and the redirection of the program in 1980 to focus more on maintenance and improvement of existing standards while emphasizing program practices.

Tracking and data acquisition (supporting activities)

The purpose of this program is to provide vital tracking and data acquisition support to all NASA flight projects. An increase of $32 million, or 9 percent, is proposed for this program in 1980.

R&D budget authority for supporting activities

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 320	$ 344	$ 376
Operations	229	252	276
Space flight tracking and data network	120	129	141
Deep space network	47	50	56
Aeronautics and sounding rocket support	5	5	5
Communications	28	35	40
Data processing	29	33	34
System implementations	40	40	46
Advanced systems	9	10	11
Research and program management	41	42	43

- An increase of $24 million in the operations funding request results from two factors: (1) continuing cost escalation in all areas of operation and (2) support of the upcoming shuttle orbital flight tests requiring additional activity in the space flight tracking and data network and increased costs for additional wideband communications circuits to transmit the high volume of data between the shuttle and ground control facilities.

HEALTH

Budget authority for health research and development is expected to increase $57 million, or less than 2 percent in 1980. The key program changes within this total are the following:

- R&D budget authority for the National Institutes of Health (HEW) for 1980 proposed at essentially the same level as 1979, compared with an increase of 15 percent in 1979 over 1978.
- An increase of 19 percent in R&D budget authority for the Alcohol Drug Abuse, and Mental Health Administration (HEW).
- An increase of 17 percent in R&D programs under the Center for Disease Control (HEW).

R&D budget authority for health as a share of total budget authority for health shows a decline from 6.5 percent in 1979 to 6.0 percent in 1980 as a result of large increases in Medicare and Medicaid programs.

R&D budget authority for health

[Dollars in millions]

	1978 Actual	1979 Estimate	1980 Estimate
Total	$2,968	$3,387	$3,444
National Institutes of Health (HEW)	2,576	2,956[a]	2,958
Alcohol, Drug Abuse, and Mental Health Administration (HEW)	180	218	259
General mental health research	124	147[b]	177
Drug abuse research	38	47	55
Alcoholism research	18	24	27
Center for Disease Control (HEW)	58	64	75
Disease control	14	16	17
Occupational health	44	48	58
Health Care Financing Administration (HEW)	29	19	35
Health Services Administration (HEW)	15	16	11
Health Resources Administration (HEW)	5	1	-
Assistant Secretary for Health (HEW)	34	34	30
Special foreign currency program (HEW)	11	11	7
Food and Drug Administration	50	53	57
Foods research	15	16	17
Drugs and devices research	17	17	18
Radiological products research	6	6	7
National Center for Toxicological Research	13	14	15
Occupational Safety and Health Administration (Labor)	4	6	6
Consumer Product Safety Commission	5	9	6

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[a] Includes $10 million supplemental request for population research.

[b] Includes $1.6 million supplemental request for research on rape prevention.

National Institutes of Health

The National Institutes of Health (NIH) is the major component of the health function, accounting for approximately 86 percent of the R&D total. Therefore the fact that this program is virtually unchanged in funding in 1980 is related to low growth in overall health research and development. Within NIH no significant funding changes are proposed for any of the institutes or research programs within the institutes with one exception, an increase proposed for the population research program of the National Institute of Child Health and Human Development, from $64 million in 1979 (including a $10 million supplemental request) to $70 million in 1980.

R&D budget authority for the National Institutes of Health

[Dollars in millions]

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 2,576	$ 2,956	$ 2,958
Cancer	835	899	899
Epidemiology	35	43	43
Carcinogenesis (physical and chemical)	115	117	120
Viral oncology	100	106	101
Nutrition	7	14[a]	16[a]
Tumor biology	74	78	80
Immunology	82	90	89
Diagnostic research	32	33	33
Preclinical treatment research	112	123	123
Clinical treatment research	132	138	138
Rehabilitation research	4	6	6
Cancer control	63	67	66
Cancer centers support	79	68	68
Research manpower development		17	17

	1978 Actual	1979 Estimate	1980 Estimate
NIH (con't)			
Heart, lung, and blood	425	484	481
Heart and vascular diseases	243	283	278
Lung diseases	57	66	64
Blood diseases and resources	59	68	67
Intramural research	37	39	42
Direct operations and program management	30	28	29
Arthritis, metabolism and digestive diseases	243	287	287
Arthritis, bone and skin diseases	38	46	46
Diabetes, endocrinology and metabolism	88	103	102
Digestive diseases and nutrition	36	43	43
Kidney diseases, urology and hematology	36	44	44
Intramural research	35	38	39
Direct operations and program management	10	13	13
General medical sciences	182	229	233
Cellular and molecular basis of disease	59	75	82
Genetics	64	83	86
Pharmacology-toxicology	21	27	25
Physiology and biomedical engineering	31	36	32
Intramural research	1	1	1
Direct operations and program management	8	7	8
Neurological and communicative disorders and Stroke	171	204	204
Communicative disorders	22	27	27
Neurological disorders	52	66	66
Stroke and nervous system trauma	28	32	32
Fundamental neurosciences	25	28	28
Intramural research	32	39	39
Direct operations and program management	12	14	14
Child health and human development	155	190[b]	194
Research for mothers and children	74	95	93
Population research	54	64[b]	70
Intramural research	19	21	21
Direct operations and program management	9	10	10

	1978 Actual	1979 Estimate	1980 Estimate
NIH (cont'd)			
Allergy and infectious diseases	154	183	182
Immunology, allergic and immunologic diseases	46	56	55
Microbiology and infectious diseases	68	84	82
Intramural research	30	33	34
Direct operations and program management	9	10	10
Eye	81	100	100
Retinal and choroidal diseases	30	38	38
Corneal diseases	9	12	12
Cataract	7	9	9
Glaucoma	8	10	10
Sensory-motor disorders and rehabilitation	16	18	18
Intramural research	8	9	10
Direct operations and program management	3	3	4
Environmental health	59	74	73
Prediction, detection and assessment of environmentally caused diseases and disorders	18	22	20
Mechanisms of environmental diseases and disorders	11	16	14
Environmental health research	9	10	10
Intramural research	17	22	24
Direct operations and program management	4	4	5
Dental	58	61	61
Caries research	11	11	11
Periodental diseases	7	7	7
Restorative materials	3	3	3
Craniofacial anomalies	7	8	7
Pain control and behavioral studies	2	2	3
Soft tissue, stomatology and nutrition	4	6	6
Dental research institutes	8	8	8
Intramural research	12	13	13
Direct operations and program management	4	4	4

	1978 Actual	1979 Estimate	1980 Estimate
NIH (cont'd)			
Aging	35	54	54
Aging research	24	40	39
Intramural research	8	11	11
Direct operations and program management	2	4	4
Research resources	145	154	154
Clinical research	52	52	52
Biotechnology research	13	14	14
Laboratory animal sciences and primate research	23	23	23
Biomedical research support	41	45	45
Minority biomedical support	11	15	14
Chemical/biological information handling research	1	-	-
Direct operations and program management	5	5	5
John E. Fogarty International Center	9	9	9
National Library of Medicine	8	10	9
Office of the Director	17	19	19

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[a] Excludes nutrition research in other NIH program areas ($27 million in 1979 and $31 million in 1980).

[b] Includes a $10 million supplemental request for population research.

This increase will provide for the initiation of two major activities: (1) the use of certain synthetic hormones for female birth control and (2) the investigation of a new oral androgen (male sex hormone) for male fertility regulation as well as preclinical studies on two long-acting androgens.

Some areas of special attention within the NIH budget request for 1980 are not apparent since they involve more than one institute. As part of the overall prevention research initiative, for example, $11 million has been redirected from various institute funds for increased efforts in smoking research, including the roles of smoking and diet in arteriosclerosis, in toxicology research, and in tropical infectious diseases research as part of an international program. Other important cross-cutting issues include nutrition, diabetes, and recombinant DNA.

Alcohol, Drug Abuse, and Mental Health Administration

The proposed increase of $42 million, or 19 percent, in R&D programs of the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) reflect the recommendations of the President's Commission on Mental Health.

A $30 million increase in mental health research, 21 percent over 1979, provides for increased funding for the following areas: (1) a major, new research initiative related to the prevention of mental illness, (2) studies of the major mental illnesses, and the basic psychological, sociological, biological, and developmental processes involved, (3) research on mental health services delivery, and (4) a strengthening of the overall research base.

Center for Disease Control

An $11 million increase requested for the Center for Disease Control primarily covers occupational health research carried out by the National Institute of Occupational Safety and Health (NIOSH). Most increases are proposed for four new programs: (1) metal and nonmetallic mining, (2) health hazard evaluation for response to health hazard requests, (3) occupational health and safety data collection for early identification of potential exposure agents, and (4) smoking research towards standards for restricting smoking in occupational settings where interaction with chemical agents may occur.

ENERGY

Within the energy function R&D budget authority is expected to decline approximately 2 percent in 1980. This reflects an administration policy of concentrating on longer-term R&D projects that have high levels of risk combined with high payoff potential and where there is little incentive for private investment. With increases in prices and other incentives for the private sector, such as are provided through the recently enacted National Energy Act, private firms can be expected to finance research and development where technical risks are relatively low and development times relatively short. Major changes in Energy R&D programs are as follows:

- An increase of 28 percent in basic research to $229 million in 1980.
- An increase of 11 percent for overall solar R&D and 16 percent for longer-term solar technology.
- A decrease of 15 percent in nuclear fission, primarily reflecting the proposal to terminate the Clinch River breeder reactor.
- A decline of 9 percent in fossil fuels, primarily reflecting a cut in oil and gas recovery demonstration programs.
- An increase of 13 percent in environmental R&D, particularly for studies related to human health.

Energy R&D budget authority as a percent of total energy budget authority is an estimated 76 percent in 1980, excluding from the total $15 billion in anticipated new borrowing authority for the Tennessee Valley Authority power program.

R&D budget authority for energy

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 3,134	$ 3,485	$ 3,429
Department of Energy	2,867	3,213	3,144
Solar	311	383	425
Geothermal	105	155	138
Biomass	21	42	57
Nuclear fission	924	940	798
Magnetic fusion	207	236	256
Fossil fuels	687	730	665
Electric energy systems and storage	88	97	91
Environmental R&D	185	188	213
Supporting research[a]	160	187	241
Energy conservation	165	230	231
Policy analysis and studies	13	15	19
Bonneville Power Administration	4	10	10
Nuclear Regulatory Commission	137	160	183
Environmental Protection Agency	130	112	103

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[a] This program area encompasses energy basic research programs.

Department of Energy

Solar energy

An increase of $41 million, or 11 percent, is proposed for the solar energy activities of DOE in 1980.

R&D budget authority for solar energy

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 311	$ 383	$ 425
Solar applications	109	125	123
Systems development	NA	40	46
Demonstrations	NA	66	48
Market development and training	NA	17[a]	27
Personnel resources	-	2	3
Solar technology	203	259	301
Solar thermal electric power systems	NA	69	81
Photovoltaic energy development	NA	104	130
Wind energy conversion systems	NA	59	63
Ocean systems	NA	24	24
Program direction	NA	3	3

[a] Includes a $13.8 million supplemental request.

The objectives of the solar applications program are to help accelerate the use of solar energy for cooling and passive solar for buildings, industrial processes, and agricultural purposes. The decline in demonstrations reflects the phaseout of the program to demonstrate the feasibility of solar heating and cooling of buildings. As a result the proposed budget authority for 1980 shows little change from the 1979 level.

The proposed increase of $43 million, or 16 percent, in 1980 for solar technology provides for substantial expansion for solar thermal electric power systems and photovoltaics with particular emphasis on high risk, high payoff projects.

Geothermal

The geothermal program of DOE is expected to decrease $17 million, or 11 percent, in 1980. A decline in hydrothermal resources funding is primarily the result of completion of the pre-commercial program in 1979 and expected completion of the industry-coupled case study in 1980. Both of these programs are under the broader resource definition program. Under geothermal technology development, another broad area, decreases are planned for geosciences, energy conversion, and geochemical engineering and materials.

R&D budget authority for geothermal energy

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 105	$ 155	$ 138
Hydrothermal resources	NA	69	58
Geopressured resources	NA	28	36
Geothermal technology development ..	NA	56	42
Personnel resources	NA	2	2

Biomass

A major portion of the increase of $15 million in DOE 1980 biomass research and development is for the conversion technology program . Funds are to be used for work on thermochemical gasification conversion technologies.

R&D budget authority for biomass

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 21	$ 42	$ 57
Technical support	NA	16	16
Production systems	NA	4	6
Conversion technology	NA	16	25
Research and exploratory development..	NA	5	8
Support costs	NA	1	2
Personnel resources	NA	1	1

Nuclear fission

An overall reduction of $143 million, or 15 percent, is shown in DOE's nuclear fission R&D programs in the 1980 budget. This drop is largely the result of administration policies not to reprocess spent fuel from commercial nuclear power plants and not to proceed with the Clinch River breeder reactor program.

R&D budget authority for nuclear fission

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 924	$ 940	$ 798
Converter	96	111	95
Thermal reactor technology	19	24	37
Advanced reactor systems	-	(a)	10
Gas cooled thermal reactors	32	40	-
Advanced isotope separation technology	44	46	46
Personnel resources	2	2	2
Commercial waste management	160	153	182
Terminal isolation R&D	NA	126	165
Waste treatment technology	NA	22	14
Supporting studies	NA	4	2
Decontamination and decommissioning	NA	(b)	(b)
Personnel resources	NA	1	1
Spent fuel disposition	5	6	19
Domestic spent fuel storage	NA	3	14
International spent fuel storage	NA	3	4
Personnel resources	NA	(b)	1
Advanced nuclear systems	70	50	38
Advanced systems evaluation	23	10	3
Space and terrestrial applications	46	38	34
Personnel resources	1	1	1
Breeder reactor systems	568	613	464
Liquid metal fast breeder reactor (LMFBR)	413	460	349
Breeder reactor studies	NA	15	55
Clinch River breeder reactor project	NA	172	-
Fast flux test facility program	NA	66	76
Breeder technology	NA	137	142
Test facilities	NA	70	75
Water cooled breeder	39	51	58
Gas cooled breeder	15	25	25
Fuel cycle R&D	91	67	21
Personnel resources	10	10	12
Light water reactor facilities	24	7	

[a] Under fuel cycle R&D in 1979 for a total of $4 million.
[b] Less than $500,000.

An increase of $13 million in thermal reactor technology under the converter program reflects initiation of a proposed international program to develop a direct cycle, high temperature, gas cooled reactor (HTGR) and proliferation-resistant, medium-enriched HTGR fuel. An increase in advanced reactor systems provides for the initiation of a program to develop and demonstrate the technology of nonproliferation features under consideration for commercial power reactors. No funds are requested for gas cooled thermal reactors since the administration is proposing that work on the steam cycle, high temperature, gas cooled reactor (HTGR) be discontinued in 1980.

Additional funding of $29 million is requested for commercial waste management. Within this broad area the terminal isolation program is the chief one. Special emphasis will be given to mined repositories in deep geologic formations and to development and design efforts on the basalt repository on the Hanford Reservation.

The proposed $12 million increase for spent fuel disposition provides primarily for planning and analysis necessary for provision of adequate domestic spent fuel storage capacity by 1983.

The $11 million decrease in the 1980 funding level for advanced nuclear systems reflects completion of the major portions of the nonproliferation alternative systems assessment program (NASAP).

A decrease of $148 million, or 24 percent, is proposed for breeder reactor systems for 1980. The $111 million cut in the liquid metal fast breeder reactor (LMFBR) reflects an administration proposal to terminate the Clinch River breeder reactor demonstration project although substantial increases are proposed for research on LMFBR base technologies, fuel components, and safety.

The decrease of $46 million for fuel cycle R&D reflects the redirection of this program to breeder reactor applications and the termination of the refabrication and Barnwell nuclear fuel plant efforts. No funds are requested for light water reactor facilities since the loss-of-fluid test facility (LOFT) has been completed and will be turned over to the Nuclear Regulatory Commission for operation.

Magnetic fusion

The DOE magnetic fusion program shows a moderate increase of $20 million, or 9 percent. The net decline proposed for the Tokamak confinement system program includes a decrease of almost $18 million in major device fabrication funds, as a result of the completion of several large devices, and an increase of more than $16 million for research operations funds.

R&D budget authority for magnetic fusion

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 207	$ 236	$ 256
Confinement system	NA	89	93
Tokamak systems	NA	68	66
Magnetic mirror systems	NA	21	27
Development and technology	NA	51	50
Magnetic systems	NA	15	15
Plasma engineering	NA	14	10
Fusion reactor materials	NA	9	11
Fusion systems engineering	NA	10	10
Environment and safety	NA	1	1
Fusion energy application	NA	3	3
Applied plasma physics	NA	61	71
Advanced plasma	NA	22	30
Fusion plasma theory	NA	17	18
Experimental plasma research	NA	12	13
National MFE computer network	NA	10	11
Reactor projects	NA	32	39
Tokamak fusion test facility	NA	25	33
Fusion materials irradiation test facility	NA	8	7
Program direction	NA	3	3

Fossil fuels

The proposed decline of $65 million in R&D support by DOE for fossil energy in 1980 reflects the present emphasis on longer-term activities with higher risks and higher potential payoffs. Reliance is now placed on the potential for private sector investments for the near term and for large demonstration projects. Decreased support is proposed for demonstration of enhanced oil and gas recovery, and on coal conversion technologies. Emphasis continues to be placed, however, on coal liquefaction and surface coal gasification while significant expansion (from $7 million in 1979 to $43 million in 1980) is proposed for advanced environmental control technology. Environmental standards pose the greatest constraint on increasing the direct use of coal, the chief thrust of the fossil energy R&D program.

R&D budget authority for fossil energy

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 687	$ 730	$ 665
Coal	582	590	583
Mining R&D	NA	75	60
Coal liquefaction	NA	116	122
Surface coal gasification	NA	94	104
In-situ coal gasification	NA	14	10
Advanced research and technology development	NA	40	39
Advanced environmental control technology	NA	7	43
Heat engines and heat recovery	NA	58	46
Combustion systems	NA	58	57
Fuel cells	NA	41	20
Magnetohydrodynamics	NA	77	72
Personnel resources	NA	10	11
Petroleum	77	107	55
Enhanced oil recovery	NA	53	21
Oil shale	NA	48	27
Drilling and offshore technology	NA	3	3
Advanced process technology	NA	2	4
Personnel resources	NA	1	1
Gas	27	34	27
Enhanced gas recovery	NA	33	27
Personnel resources	NA	(a)	(a)

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[a] Less than $500,000.

Electric energy systems and storage

The overall net decrease of 6 percent proposed for this DOE program in 1980 reflects a cut of $14 million in the power delivery program, chiefly proposed decreases for underground transmission and compact systems.

R&D budget authority for electric energy systems and storage

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 88	$ 97	$ 91
Electric energy systems	38	39	27
Power supply integration	NA	15	17
Power delivery	NA	23	9
Personnel resources	NA	1	1
Energy storage systems	50	57	64
Battery storage	NA	24	32
Thermal and mechanical storage	NA	32	31
Personnel resources	NA	1	1

Environmental R&D

An increase of $25 million, or 13 percent, is proposed for DOE environmental R&D in 1980. A major portion of the growth for the overview and assessment program is for planned expansion of the liquified fuels program to include LPG, hydrogen, ammonia, and other energy materials. Within the biomedical and environmental research program, the largest increases are proposed for human health studies, primarily for the expansion of studies to determine the effects of low-level radiation on humans and late effects in experimental animals. Additional funding is also proposed for studies of diesel engine emissions to determine their potential health effects.

R&D budget authority for environmental R&D

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 185	$ 188	$ 213
Overview and assessment	49	49	58
Biomedical and environmental research ..	136	139	154
Human health studies	NA	24	30
Health effects research in biological systems	NA	46	48
Environmental studies	NA	45	46
Physical and technological studies ...	NA	21	24
Carbon dioxide effects research and assessments	NA	3	6

Supporting research

An increase of $54 million, or 29 percent, is proposed for DOE supporting research. The 25 percent expansion in basic energy sciences in 1980 covers basic research support to advance the understanding of fundamental phenomena underlying all energy technologies. An increase in the university research support program provides for the initiation of regionally based university coal research laboratories.

R&D budget authority for supporting research

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 160	$ 187	$ 241
Basic energy sciences	157	177	221
Nuclear sciences	NA	28	31
Low energy nuclear sciences	NA	20	22
Isotope preparation	NA	8	9
Materials science	NA	72	81
Metallurgy and ceramics	NA	30	34
Solid state physics	NA	32	36
Materials chemistry	NA	10	11
Chemical sciences	NA	48	59
Fundamental interactions	NA	28	34
Processes and techniques	NA	20	25
Engineering, mathematical, and geosciences	NA	16	24
Engineering	NA	1	2
Mathematical sciences	NA	9	11
Geosciences	NA	6	11
Advanced energy projects	NA	7	17
Biological energy sciences	NA	4	7
Personnel resources	NA	2	3
University research support	1	3	9
Technical assessment projects	2	7	11

Energy conservation

R&D funds for DOE energy conservation have increased significantly over the past several years, but the proposed level for 1980 shows essentially no change over 1979. Efforts on near-term conservation technology are reduced in view of increased incentives now given for private investment in improved energy use efficiency in the near term. Programs in the 1980 budget continue to assist industry in the development of advanced technologies for use in the building industry and transportation sectors.

R&D budget authority for energy conservation
/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 165	$ 230	$ 231
Buildings and community systems	63	85	85
Building systems	NA	18	17
Appliance standards	NA	8[a]	6
Community systems	NA	19	17
Urban waste	NA	9	10
Technology and consumer products	NA	20	21
Analysis and technology transfer	NA	3	5
Residential conservation service	NA	4[b]	3
Federal energy management program	NA	1	(c)
Small business	NA	1	1
Personnel resources	NA	4	5
Industrial energy conservation	31	39	41
Waste energy conservation	NA	15	15
Industrial process efficiency	NA	14	10
Industrial cogeneration	NA	5	4
Implementation and commercialization	NA	3	10
Personnel resources	NA	2	2
Transportation energy conservation	67	98	96
Vehicle propulsion R&D	NA	46	42
Alternative fuels utilization	NA	6	5
Electric/hybrid vehicle program	NA	38	41
New concepts	NA	3	3
Transportation systems utilization	NA	1	2
Nonhighway transport systems	NA	2	1
Personnel resources	NA	2	2
Multisector appropriate technology	3	8	9

[a] Includes $3.8 million supplemental request.
[b] Includes $4.0 million supplemental request.
[c] Less than $500,000.

Nuclear Regulatory Commission

The R&D program of the Nuclear Regulatory Commission (NRC) is expected to increase 14 percent in 1980. The budget reflects increases in the loss of fluid test facility (LOFT) program from the first full-year funding of facility operations by NRC. Increases will also be given to nuclear waste management research, site safety research, and risk assessment.

R&D budget authority for the energy program of
the Nuclear Regulatory Commission

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 137	$ 160	$ 183
Reactor safety research	122	145	168
Environmental and fuel cycle research..	8	9	9
Safeguards research	7	6	5

Environmental Protection Agency

The energy R&D program under the Environmental Protection Agency (EPA) is expected to decrease $10 million, or 8 percent, in 1980. The largest cuts are proposed for programs covering the impact of conventional and advanced energy systems and the health effects of energy-related pollutants.

R&D budget authority for the energy R&D program of the Environmental Protection Agency

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 130	$ 112	$ 103
Fuel processing, preparation and advanced combustion	24	13	13
Fuel extraction	7	3	3
Impact of conventional and advanced energy systems	17	17	13
Flue gas sulphur oxide control	11	3	2
Nitrogen oxide control	21	14	14
Flue gas particulate control	14	9	8
Effects of energy-related pollutants on organisms and ecosystems	11	16	15
Transportation and fate of energy-related pollutants	4	9	8
Measurement systems and instrumentation development for energy-related pollutants	9	8	8
Health effects of energy related pollutants	12	20	18

GENERAL SCIENCE AND BASIC RESEARCH

The area of general science and basic research includes those Federal R&D programs that are viewed as supporting and extending the Nation's scientific base in a broad sense rather than supporting the missions of agencies with specific responsibilities like national defense, health, or space exploration. The programs that fall within this area are sponsored by two agencies; the National Science Foundation (NSF) and the Department of Energy (DOE). All the NSF programs and three DOE programs are included.

Total budget authority for R&D support within this function is $1,248 million in 1980, up 11 percent from the 1979 estimate of $1,128 million. The chief features of 1980 R&D program plans are the following:

- An increase of $91 million, or 11 percent, in NSF R&D programs with most of the increase shown in research project support across all major fields.
- An increase of $4 million, or 22 percent, in NSF science education R&D, continuing a rise that began in 1979.
- An increase of $28 million, or 9 percent, in DOE research programs, mostly the result of a $20 million increase for high-energy physics.

Within the general science and basic research function 84 percent of the total budget authority in 1980 consists of R&D programs, most of them basic research. Other programs within the function are made up of R&D plant within NSF and DOE, of non-R&D programs in NSF science education and of NSF data collection and some international program efforts.

R&D budget authority for general science and basic research

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 1,050	$ 1,128	$ 1,248
National Science Foundation	749	819	910
Mathematics, physical sciences and engineering	238	262	296
Astronomical, atmospheric, earth, and ocean sciences	196	208	235
Biological, behavioral, and social sciences	145	160	177
Applied science and research applications	59	67	67
U.S. Antarctic program	44	47	50
Scientific, technological, and international affairs	26	28	29
Science education	13	16	20
Special foreign currency program	5	4	6
Program development and management	23	27	28
Department of Energy	302	309	337
High-energy physics	189	195	215
Nuclear physics	69	75	82
Life sciences research and biomedical applications	43	39	41

National Science Foundation

The mathematics and physical sciences and engineering (MPE) program area reflects a 13-percent increase over 1979, or $35 million. Almost one-half of this increase is devoted to instrumentation, which is considered part of the conduct of research and development. Among MPE subactivities the largest relative increases are given to chemistry--up 17 percent, and materials research--up 17 percent. Within engineering, which is scheduled for 15-percent growth, special impetus is given under electrical sciences to solid state and microstructures engineering, which will rise an estimated 27 percent to more than $3 million as part of a broad administration thrust in microelectronics and submicron science and technology.

R&D budget authority for mathematical and physical sciences and engineering

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 238	$ 262	$ 296
Mathematical sciences	21	23	26
Computer research	17	17	19
Physics	50	55	60
Chemistry	43	46	53
Engineering	43	47	54
Civil and environmental engineering	7	8	10
Electrical sciences and analysis	14	15	18
Engineering chemistry and energetics	11	13	14
Mechanical sciences and engineering	11	10	12
Materials research	56	60	70
Industry/university cooperative research	1	4	4
Regional instrumentation facilities	3	4	4
Program development and management	5	6	6

The astronomical, atmospheric, earth, and ocean sciences (AAEO) program area shows a proposed increase of $27 million, or 13 percent, over 1979 with almost $7 million directed to instrumentation. While all major areas show growth, special emphasis is placed on the earth sciences, notably the ocean sediment coring program, which is scheduled for a 45-percent rise. Earth sciences, thus, would increase 21 percent overall compared with 15 percent for astronomical sciences, 14 percent for atmospheric sciences, and 9 percent for ocean sciences.

R&D budget authority for astronomical, atmospheric, earth and ocean sciences

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 196	$ 208	$ 235
Astronomical sciences	43	46	53
Astronomy project support	16	17	18
National Astronomy and Ionosphere Center	4	5	5
Kitt Peak Observatory	9	10	11
Cerro Tololo Inter-American Observatory	4	4	5
National Radio Astronomy Observatory...	9	9	12
Sacramento Peak Observatory	1	2	2
Atmospheric sciences	52	54	61
Atmospheric sciences project support...	20	21	25
Climate dynamics program..............	4	5	6
Global atmospheric research program ...	5	6	6
National Center for Atmospheric Research	21	21	22
National Scientific Balloon Facility...	2	2	2
Earth sciences	34	37	44
Earth sciences project support	21	25	27
Ocean sediment coring program	13	12	18
Ocean sciences	56	60	66
Oceanography project support	19	20	22
International decade of ocean exploration	18	20	22
Oceanographic facilities and support...	19	21	22
Arctic research program	5	6	6
Program development and management.......	5	6	6

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The biological, behavioral, and social sciences (BBS) program area is expected to increase by $17 million, or 11 percent, in 1980 with $4 million directed to instrumentation. The greatest absolute increase is given to physiology, cellular and molecular biology, which will grow by a projected $8 million, or 12 percent; this growth includes a 53-percent increase in biological instrumentation. The greatest relative increase is shown in environmental biology, with growth of $5 million, or 16 percent. The social sciences increase is only 5 percent.

R&D budget authority for biological, behavioral, and social sciences

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 145	$ 160	$ 177
Physiology, cellular and molecular biology	57	62	70
Behavioral and neural sciences	28	34	37
Environmental biology	31	34	39
Social sciences	24	26	27
Program development and management	3	4	5

In the applied science and research applications program area, where virtually all NSF applied research is sponsored, a decline is shown in total budget authority in 1980 that amounts to a leveling off. A decrease of $3 million in problem-focused research applications reflects the termination of the chemical threats and community water management programs. Earthquake hazards work will continue, however. A rise in intergovernmental science and public technology is caused by the expansion in a new experimental program to encourage competitive research at the State level.

R&D budget authority for applied science and research applications

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 59	$ 67	$ 67
Problem analysis	1	1	1
Integrated basic research	1	5	5
Applied research	18	20	20
Applied social and behavioral sciences	9	9	9
Applied physical, mathematical and biological sciences, and engineering..	9	11	11
Problem-focused research applications....	27	29	25
Earthquake hazards mitigation	18	17	18
Chemical threats to man and environment	3	3	0
Alternative sources of materials.......	4	4	4
Community water management	2	1	0
Science and technology to aid the physically handicapped	0	2	2
Human nutrition	0	1	1
Intergovernmental	7	5	5
Industry	1	2	3
Experimental program to stimulate competitive research	0	1	3
Program development and management	4	5	5

The U.S. Antarctic research program is focused on two areas: (1) environmental research and (2) mineral and marine resources research. The latter program shows growth of 55 percent in the 1980 budget to expand work on Antarctic krill and the sourrounding marine ecosystems. This increase plus a 10-percent increase in environmental research make for a gain of $1.5 million, or 24 percent, in the Antarctic research program. Operations support is almost six times the cost of the research program, and this will increase an estimated 6 percent.

R&D budget authority for U.S. Antarctic research

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 44	$ 47	$ 50
Research program	6	6	8
Operations support program	38	41	43

Scientific, technological, and international affairs research is expected to receive scarcely any increase in funding in 1980. Most programs remain at essentially the same levels as in 1979.

R&D budget authority for scientific, technological, and international affairs

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 26	$ 28	$ 29
International cooperative scientific activities	9	10	10
Policy research and analysis	5	6	6
Science resources studies	1	1	1
Information science and technology	5	4	5
NSF planning and evaluation	1	1	1
Program development and management	5	6	6

Science education R&D programs are scheduled to grow by $4 million, or 22 percent, in 1980. Within the science education development and research program, development is expected to increase 14 percent and research 66 percent. In recent years NSF support of science education development and research has declined sharply; the proposed program increases permit a reversal of this trend with current emphasis on research to generate new knowledge and theory as a basis for significant change in science education.

R&D budget authority for science education

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 13	$ 16	$ 20
Science education development and research	9	12	15
Development in science education	6	8	9
Research in science education	3	4	6
Science and society: ethics and values ...	(a)	1	1
Program development and management	3	4	4

[a] Less than $500,000.

The remaining NSF R&D funding consists of the special foreign currency program and executive management and central support services and administration

Department of Energy

Within DOE's broad energy technology program are three basic sciences programs: high-energy physics, nuclear physics, and life sciences research and biomedical applications. High-energy physics, by far the largest since it is based on the operation of high-energy particle accelerators and colliding beam devices, is scheduled to increase by $20 million in 1980. This increase of 10 percent is based on the DOE long-range plan for a constant level of effort over the next few years to seek an understanding of the forces binding the smallest particles of matter.

The nuclear physics program is concerned with studies of the interactions, structure, and other fundamental characteristics of nuclei. Work in this field also is highly dependent on access to major accelerator facilities. Research is scheduled to increase by $7 million in 1980, or 9 percent.

The life sciences and biomedical applications program covers (1) studies of how physical and chemical agents interfere with life processes and (2) efforts to utilize stable and radioactive isotope probes in medical diagnosis and therapy. The overall program is scheduled for growth of less than 3 percent in 1980, or a slight decline in real terms.

R&D budget authority for Department of Energy basic sciences programs

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 301	$ 309	$ 337
High energy physics	189	195	215
Physics research	NA	64	72
Facility operations	NA	94	105
High energy technology	NA	35	37
Personnel	NA	1	1
Nuclear physics	69	75	82
Medium-energy nuclear physics	35	38	42
Heavy ion nuclear physics	29	31	34
Nuclear theory	5	6	6
Personnel resources	(a)	(a)	(a)
Life sciences research and biomedical applications	43	39	41
General life sciences	26	23	23
Biomedical applications	17	16	18

[a] Less than $500,000.

Basic Research: All Functions

The administration is continuing a policy of assuring real support to basic research. The basic research total of $4.6 billion in 1980 is, thus, an estimated 9 percent above the 1979 total of $4.2 billion.

Budget authority for basic research by function

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 3,665	$ 4,214	$ 4,587
General science and basic research	962	1,034	1,148
National Science Foundation	678	741	828
Department of Energy	284	293	320
All other functions	2,703	3,180	3,439
Health	1,246	1,533	1,548
Space research and technology	412	455	551
National defense	320	380	441
Natural resources and environment	207	231	238
Agriculture	197	220	237
Energy	157	178	229
Transportation	70	78	81
Education, training, employment and social services	57	63	67
Commerce and housing credit	9	12	14
Administration of justice	10	11	13
Veterans benefits	9	10	10
Community and regional development	8	10	9
Income security	1	1	1
International affairs	(a)	(a)	-
General government	-	-	-

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[a] Less than $500,000.

The general science and basic research function accounts for one-fourth of all Federal basic research sponsorship. Basic research funding within this function is scheduled for an 11-percent increase in 1980, most of it attributable to NSF programs, which show a planned $87 million increase, or 12 percent.

The health function, which accounts for an even greater funding total, is expected to reflect a virtual leveling off in basic research budget authority. Most of this work is sponsored by the National Institutes of Health (HEW). The space function, by contrast, will show the greatest dollar increase in 1980 of any function in basic research budget authority--$96 million, or 21 percent more than the 1979 level. Most of this effort will be found in NASA space science, applications, and technology.

National defense, in effect DOD, will increase basic research by an anticipated 16 percent as part of a continuing effort to build the technology base mission area. This function, with dollar growth of $61 million, will account for the third largest dollar gain.

Natural resources and environment reflects almost a leveling off. Most of the basic research within this function is carried out by the Geological Survey (Interior). The second largest basic research effort is the responsibility of the Forest Service (USDA).

The agriculture function shows a $17 million increase, or 8 percent. Important growth is shown both within Agricultural Research and Cooperative Research of the Department of Agriculture.

The energy function is scheduled for a $51 million increase in basic research in 1980, or 28 percent. This, the largest relative increase among all functions, covers growth in the basic energy sciences; nuclear, material, chemical, engineering, mathematical, and geosciences; in advanced energy projects; and in biological energy research. All these programs are sponsored by DOE.

The remaining functions account for only 4 percent of all Federal basic research funding in the current (1978-80) budget period.

NATURAL RESOURCES AND ENVIRONMENT

R&D budget authority for natural resources and environment is expected to increase by $60 million, or 6 percent, in 1980. The major changes proposed for 1980 are as follows:

- An increase of 16 percent in R&D programs related to pollution control and abatement, reflecting a major initiative of the Environmental Protection Agency (EPA) in preventive health concerned with improving the agency's health data base.
- An increase of 17 percent in R&D programs of the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce.
- An increase in basic research of 3 percent to a total of $238 million in 1980.

R&D budget authority for natural resources and environment as a share of total Federal budget authority for this function is expected to be 8 percent in 1980.

R&D budget authority for natural resources and environment

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 898	$ 994	$1,054
Water resources	62	64	71
Bureau of Reclamation (Interior)	11	11	12
Office of Water Research and Technology (Interior)	25	28	30
Corps of Engineers - Civil Works (DOD)	27	26	29
Conservation and land management	110	119	112
Forest Service (USDA)	107	113	105
Bureau of Land Management (Interior)	1	1	1
Office of Surface Mining and Reclamation (Interior)	2	5	5
Recreational resources	39	45	47
Fish and Wildlife Service (Interior)	30	36	36
National Park Service (Interior)	9	9	11
Pollution control and abatement	249	288	333
Environmental Protection Agency	249	288	333
Other natural resources	438	479	491
National Oceanic and Atmospheric Administration (Commerce)	161	179	208
Geological Survey (Interior)	158	173	173
Bureau of Mines (Interior)	117	125	107
Office of the Secretary (Interior)	2	2	2

Water resources

R&D programs related to water resources are expected to increase $7 million in 1980 and will account for an estimated 7 percent of the R&D total for natural resources and environment. Most of this work is conducted by the Department of the Interior.

Conservation and land management

Conservation and land management represents 11 percent of the R&D portion of the function total in 1980. The proposed decrease of $7 million for R&D activities in this area reflects cutbacks in programs of the Forest Service (USDA). The largest decrease, of almost $3 million, is for research on methods of reclaiming and revegetating surface-mined land. This represents a phasing down of the research portion of the surface environment and mining (SEAM) project since it will have met most of its objectives by 1980.

R&D budget authority for the Forest Service (USDA)

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 107	$ 113	$ 105
Land and resource protection research	51	54	48
Fire and atmospheric research	9	10	9
Forest insects and disease research	21	22	20
Renewable resources evaluation	14	14	13
Renewable resources economic research	5	5	5
Surface environment and mining	3	3	1
Renewable resources management and utilization programs	54	58	57
Trees and timber management research	19	20	20
Forest watershed	9	10	10
Wildlife, range, and fish habitat research	8	9	8
Forest recreation research	3	3	2
Forest products utilization research	13	14	15
Forest engineering research	2	2	2
Other Forest Service R&D	1	1	1

Pollution control and abatement

The proposed increase of $46 million for pollution control and abatement R&D activities primarily reflects a major EPA initiative in preventive health, particularly within the air, drinking water, and toxic substances media.

R&D budget authority for the Environmental Protection Agency[a]

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 249	$ 288	$ 333
Programs funded by the EPA R&D appropriation[a]	187	222	266
Air	42	53	72
Health and ecological effects	NA	31	47
Health effects/transportation sources	NA	6	7
Health effects/criteria pollutants	NA	2	7
Health effects/non-criteria pollutants		11	17
Ecological effects	NA	1	2
Transport and fate of pollutants	NA	11	13
Industrial processes	NA	4	4
Monitoring and technical support	NA	18	21
Water quality	69	67	64
Health ecological effects	NA	24	22
Health effects	NA	6	7
Transport and fate of pollutants	NA	1	1
Chesapeake Bay	NA	2	3
Great Lakes	NA	4	2
Marine ecological effects	NA	3	3
Fresh water	NA	7	6
Industrial processes	NA	11	15
Public sector activities	NA	21	14
Monitoring and technical support	NA	11	12

	1978 Actual	1979 Estimate	1980 Estimate
EPA R&D appropriation (cont'd)			
Drinking water	16	18	24
Public sector activities	NA	17	23
Health effects	NA	7	12
Treatment and ground water activities	NA	10	11
Monitoring and technical support	NA	1	1
Solid waste - public sector activities	7	8	8
Pesticides	12	15	10
Health and ecological effects	NA	11	8
Substitute chemicals	NA	3	(b)
Health effects	NA	6	6
Ecological effects	NA	3	3
Industrial processes	NA	4	1
Monitoring and techical support	NA	(c)	(c)
Radiation - health effects	1	2	3
Interdisciplinary	12	21	25
Health and ecological effects	NA	8	5
Anticipatory research	NA	9	17
Monitoring and technical support	NA	4	3
Toxic substances	8	15	34
Health and ecological effects	NA	12	29
Health effects	NA	8	15
Ecological effects	NA	1	10
Transport and fate	NA	2	3
Stratosphere modification	NA	1	1
Industrial processes	NA	1	2
Monitoring and technical support	NA	2	3
Management and support	20	24	28
Programs funded under the abatement and control appropriation	58	63	63
Special foreign currency program	4	2	2

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[a] Excludes energy-related R&D programs.

[b] Program transferred to the abatement and control appropriation in 1980.

[c] Less than $500,000.

The $19 million proposed increase for the air media includes $15 million for preventive health research on the effects of criteria, noncriteria, and transportation-related air pollutants. Criteria refer to the reevaluation and revision of health effects criteria for air quality standards required by the Clean Air Act Amendments of 1977.

The increase of $19 million proposed for toxic substances reflects a major, new integrated research approach to assessing total human exposure to and adverse health effects from toxic substances. Preventive public health research activities account for approximately $15 million of the increase including $6 million for health effects research and $9 million for the ecology program to support research initiatives focused on predicting the movement and fate of toxic substances.

Most of the increase of $6 million for drinking water will support research to identify and study the role of organics and other key contaminants causing adverse health effects, including some cancers, heart disease, neurologic impairments, and teratogenic effects.

The net increase of $4 million proposed for the interdisciplinary media provide for an increase of almost $8 million in anticipatory research to provide a stable base for long-term research and insure the adequacy of the scientific base for future regulatory actions.

Other natural resources

The net increase of $12 million proposed for other natural resources reflects an increase of more than $29 million in R&D efforts of NOAA within Commerce and a partially offsetting decrease of $17 million in programs of the Bureau of Mines (Interior). The major NOAA increases are for ocean fisheries and resource ecosystems resources, basic environmental services, and marine ecosystems analysis and dumping. The decline in R&D efforts of the Bureau of Mines reflects elimination of the mined land demonstration program.

R&D budget authority for the National Oceanic and Atmospheric Administration (Commerce)

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 161	$ 179	$ 208
Mapping, charting, and surveying services	5	5	8
Ocean fisheries and living marine resources	55	59	71
Marine ecosystems analysis and dumping	8	15	19
Marine technology	15	11	12
Sea grant	18	21	21
Basic environmental services	15	17	22
Environmental satellite services	7	8	8
Public forecast and warning services	9	12	13
Specialized environmental services	6	6	7
Global monitoring of climatic changes	2	2	4
Weather modification	6	7	8
International projects	8	9	9
Executive direction and administration	7	7	7

R&D budget authority for the Geological Survey (Interior)

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 158	$ 173	$ 173
Alaska-pipeline-related investigations	(a)	-	-
Research on mapping technology	2	2	2
Earthquake hazards reduction	28	29	29
Other geologic hazards	2	3	2
Geologic framework	12	15	13
Mineral resources investigations	25	29	31
Coal resources investigations	5	4	4
Onshore oil and gas and oil shale resources investigations	7	7	7
Uranium/thorium resources investigations	5	6	6
Geothermal resources investigations	9	11	9
Environmental aspects of energy investigations	7	7	9
Offshore geologic surveys	14	14	14
Water resources investigations	29	31	35
Conservation of lands and minerals	1	1	1
Land information and analysis	10	12	10
Exploration of national petroleum reserve in Alaska	2	2	-

[a] Less than $500,000.

R&D budget authority for the Bureau of Mines (Interior)

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 117	$ 125	$ 107
Metallurgy research	28	29	27
Mining research	57	67	67
Mining environmental research	14	13	13
Mined land demonstration	19	16	-

TRANSPORTATION

An increase of 5 percent, or $40 million, is proposed in 1980 R&D budget authority within the transportation function. The only significant change is the increase of $41 million in the NASA aeronautical research and technology program, which makes up more than one-half of all transportation R&D activities.

The 1980 budget for this NASA program provides for increased strengthening of the research and technology base; aircraft energy efforts aimed at providing improved technology leading to a major reduction in fuel requirements for transport aircraft; and research into reducing noise and pollution and improving safety and terminal area operations.

R&D budget authority for transportation as a percent of total budget authority for this function is an estimated 5 percent in 1980.

R&D budget authority for transportation

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 767	$ 822	$ 862
Ground transportation	196	197	205
Federal Highway Administration (DOT)	43	46	47
National Highway Traffic Safety Administration (DOT)	57	60	61
Federal Railroad Administration (DOT)	42	41	44
Urban Mass Transportation Administration (DOT)	54	51	52
Air transportation	506	558	597
Federal Aviation Administration (DOT)	112	110	107
Aeronautical research and technology (NASA)	395	449	490
Research and technology base	98	109	117
System studies	3	3	3
Systems technology programs	76	85	106
Experimental programs	51	66	73
Research and program management	167	185	190
Water transportation	39	38	38
Maritime Administration (Commerce)	20	19	17
Coast Guard (DOT)	19	19	21
Other transportation	26	28	22
Office of the Secretary (DOT)	25	16	11
Research and Special Programs Directorate (DOT)	1	12	11

AGRICULTURE

The overall net increase of just $4 million, or less than 1 percent, in R&D budget authority within the agriculture function reflects a policy of the Department of Agriculture of emphasizing and funding only high priority research projects essential to the Nation's agricultural and consumer needs and not likely to be otherwise funded. These special areas of emphases include the following:

- Basic research: an increase of 8 percent to $237 million is proposed for 1980.
- Energy research: an increase of $7 million is proposed, with special emphasis on production of biomass for energy and production of methane from animal and other agricultural residues.
- Competitive research grants: an increase of $15 million is proposed in basic research critical to food production and human nutrition through the participation of outstanding researchers in the entire U.S. scientific community.

R&D budget authority for agriculture as a share of total budget authority for this function is expected to increase from 7 percent in 1979 to 12 percent in 1980. This increase is the result of a large decline in the farm income stabilization program, which does not have an R&D component.

R&D budget authority for agriculture

[Dollars in millions]

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 501	$ 555	$ 559
Science and Education Administration: Agricultural Research (USDA)	311	345	341
Animal production	61	65	67
Animal production efficiency research	60	65	67
Research on housing	(a)	(a)	-
Plant production	118	133	128
Crop production efficiency research	118	131	126
Tropical and subtropical agricultural research	1	2	2
Use and improvement of soil, water, and air	38	43	45
Research on conservation and use of land and water resources and maintaining environmental quality	28	32	34
Research on watershed management	10	10	11
Processing, storage, distribution, food safety, and consumer services research	71	74	66
Processing, storage, and distribution efficiency research	56	56	45
Research to expand agricultural exports	2	3	3
Research to improve human health and safety	12	15	18
Research on consumer services	1	1	1
Human nutrition research	16	22	26
Special foreign currency program	6	6	8
Miscellaneous contributed funds	2	2	2
Science and Education Administration: Cooperative Research (USDA)	158	174	178
Payments under the Hatch Act	109	109	109
Cooperative forestry research	10	10	10
Payments to 1890 colleges and Tuskegee Institute	14	16	16
Special research grants	7	16	12

Science and Education Administration:
Cooperative Research (cont'd)

Competitive research grants	15	15	30
Plant science research targeted to crop production	10	10	21
Human nutrition research	5	5	9
Rural development research	2	2	-
Animal health and disease research	-	5	-
Federal administration	2	2	2
Economic, Statistics, and Cooperatives Service	33	36	40

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[a] Less than $500,000.

Science and Education Administration (SEA): Agricultural Research

A net decline of $4 million is shown for Agricultural Research. A $2 million increase in animal production research primarily reflects increases in basic animal research and research on energy problems.

A net decrease of $5 million in plant production research consists of increases in research on energy and integrated pest management more than offset by decreases of almost $10 million in current funding for research projects considered non-essential.

A $2 million proposed increase in soil, water, and air research reflects increases in nonpoint source pollution research and aerospace technology research with partially offsetting decreases in current funding for research projects that are not considered highly essential.

A net reduction of $8 million in processing, storage, distribution, food safety, and consumer services research primarily reflects a proposed cut of almost $10 million in post-harvest technology research.

An increase of $4 million in human nutrition includes an additional $2 million for the Human Nutrition Center at Tufts University, Boston, Massachusetts.

Science and Education Administration (SEA): Cooperative Research

A net increase of $4 million in the Cooperative Research program primarily reflects the redirection of funds from the special grants program and the animal health and disease research program to the cooperative research grants program. This program places special emphasis on basic research critical to enhancing food production (up $11 million in 1980) and to improving human nutrition (up $4 million in 1980). Competitive grants are intended to complement the ongoing research efforts of USDA and the traditional agricultural research community by obtaining the participation of research scientists throughout the entire U.S. scientific community who offer specialized expertise.

EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES

R&D budget authority for this function is expected to show an increase of only 1 percent in 1980. No significant changes are proposed for any of the components or programs.

R&D budget authority for education, training, employment and social services as a share of total budget authority for this function is an estimated 1 percent in 1980.

R&D budget authority for education, training, employment, and social services

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 344	$ 345	$ 350
Research and general education aids	169	168	176
Assistant Secretary for Education (HEW)	1	1	1
Office of Education (HEW)	44	37	41
Education for the handicapped	11	21	21
Vocational education	28	10	11
Bilingual education	1	2	6
Other OE programs	4	4	4
National Institute of Education (HEW)	90	93	94
Smithsonian Institution	35	37	39
Training and employment	87	81	81
Employment and Training Administration (Labor)	87	81	81
Youth program	71	64	64
Comprehensive Employment and Training Act (CETA)	15	15	15
Work incentive program	1	1	1
Unemployment Insurance Service	1	1	1

	1978 Actual	1979 Estimate	1980 Estimate
Education, training, employment, and social services (cont'd)			
Other labor services	11	10	11
Assistant Secretary for Policy, Evaluation, and Research (Labor)	3	2	2
Bureau of International Labor Affairs (Labor)	1	1	1
Bureau of Labor Statistics (Labor)	2	1	1
Employment Standards Administration (Labor)	2	3	4
Labor Management Services Administration (Labor)	3	3	3
Social services	75	86	82
Human Development Services (HEW)	75	86	82
Administration for Children, Youth and Families	32	38	34
Head Start	NA	11	11
Child welfare R&D	NA	16	15
Child abuse	NA	10	8
Administration on Aging	9	9	9
Rehabilitation Services Administration	33	33	29
Administration for Native Americans	(a)	1	1
Administration for Public Services	2	2	5
Special foreign currency program	-	3	4

[a] Less than $500,000.

ALL OTHER FUNCTIONS

The seven remaining functions represent areas in which R&D activities play a relatively small part. In no function does the R&D component make up more than 1 percent of the total. In another perspective, none of these areas amounts to as much as 1/2 of 1 percent of all Federal R&D budget authority in 1980, and collectively they make up less than 2 percent of the Federal R&D total.

The tables that follow identify the R&D program areas of agencies whose missions make up these functions: veterans benefits, international affairs, community and regional development, commerce and housing credit, administration of justice, income security, and general government. Tables are presented in order of size of R&D programs in 1980.

R&D budget authority for veterans benefits

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Veterans benefits	$ 111	$ 123	$ 123
Veterans Administration	111	123	123
Medical research	90	100	99
Mental health and substance abuse	11	13	13
Rehabilitation research	7	7	8
Health services research	3	3	3

R&D budget authority for international affairs

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
International affairs	$ 54	$ 75	$ 100
Agency for International Development ...	48	68	93
Department of State	3	3	2
Arms Control and Disarmament Agency.....	4	4	4

R&D budget authority for community and regional development

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 91	$ 113	$ 94
Department of Housing and Urban Development	51	57	51
Housing assistance	NA	9	9
Housing safety and standards research	NA	3	3
Housing economic data and analyses	NA	14	15
Consumer and equal opportunity research	NA	6	5
Community conservation research	NA	11	3
Community development research	NA	6	6
Energy conservation and standards research	NA	1	2
Program evaluation	NA	4	6
Research program support and evaluation	NA	2	3
Tennessee Valley Authority	16	25	24
Economic Development Administration (Commerce)	18	24	13
National Fire Prevention and Control Administration (Commerce)[a]	7	8	7

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[a] This activity will be part of the proposed Federal Emergency Management Agency to be established in 1979.

R&D budget authority for commerce and housing credit

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$76	$90	$87
Bureau of the Census (Commerce)	3	4	4
National Oceanic and Atmospheric Administration (Commerce); Commercial fisheries	11	11	-
Patent and Trademark Office (Commerce)	1	1	1
National Bureau of Standards (Commerce)	54	67	74
Measurement research and standards	33	35	42
Engineering standards	18	20	18
Consumer sciences and technology	4	11	11
Central technical support	-	2	4
National Telecommunications and Information Administration (Commerce)	2	3	3
Federal Communications Commission	2	3	3
Federal Trade Commission	1	1	1

R&D budget authority for administration of justice

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$44	$46	$49
Law Enforcement Assistance Administration (Justice)	29	33	35
Bureau of Prisons (Justice)	3	4	3
Federal Bureau of Investigation (Justice)	2	1	2
General Administration (Justice)	2	2	2
Drug Enforcement Administration (Justice)	3	2	2
Immigration and Naturalization Service (Justice)	1	1	(a)
Customs Service (Treasury)	2	2	3
Bureau of Alcohol, Tobacco, and Firearms (Treasury)	2	2	2

[a] Less than $500,000.

R&D budget authority for income security

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 43	$ 41	$ 44
Departmental management (HEW)	30	25	25
Social Security Administration (HEW)	13	16	19

R&D budget authority for general government

/Dollars in millions/

	1978 Actual	1979 Estimate	1980 Estimate
Total	$ 18	$ 18	$ 19
Bureau of Engraving and Printing (Treasury)	4	4	4
Internal Revenue Service (Treasury)	3	3	4
Office of Personnel Management	4	4	5
Advisory Commission on Intergovernmental Relations	2	2	2
Library of Congress	5	5	5

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Appendix A

Budget Authority for Basic Research, Applied Research, and Development by Function and Agency

BEST DOCUMENT AVAILABLE

NATIONAL SCIENCE FOUNDATION - DIVISION OF SCIENCE RESOURCES STUDIES

Budget Authority for Basic Research, Applied Research
and Development by Function and Agency
(dollars in millions)

Function and Agency	1978 Actual				1979 Estimates				1980 Estimates			
	Total	Basic	Applied	Development	Total	Basic	Applied	Development	Total	Basic	Applied	Development
Total	26,479.9	3,664.9	5,914.6	16,900.6	29,450.9	4,213.9	6,562.9	18,673.9	30,628.8	4,586.8	6,975.0	19,066.7
National defense	12,899.4	319.7	1,801.7	10,778.0	14,283.9	379.5	1,970.4	11,934.0	15,116.7	441.2	2,187.2	12,488.2
Dept of Defense-military	11,829.0	319.7	1,641.7	9,867.6	13,163.4	379.5	1,807.0	10,976.9	13,934.6	441.2	2,010.5	11,482.9
Dept of Defense-military	11,829.0	319.7	1,641.7	9,867.6	13,163.4	379.5	1,807.0	10,976.9	13,934.6	441.2	2,010.5	11,482.9
Atomic energy defense activities	1,069.1	-	158.7	910.4	1,120.5	-	163.4	957.1	1,182.1	-	176.7	1,005.3
Dept of Energy	1,069.1	-	158.7	910.4	1,120.5	-	163.4	957.1	1,182.1	-	176.7	1,005.3
Defense-related activities	1.3	-	1.3	-	-	-	-	-	-	-	-	-
Federal Preparedness Ag	1.3	-	1.3	-	-	-	-	-	-	-	-	-
International affairs	54.0	0.2	37.6	16.3	74.5	0.2	58.8	15.5	99.5	-	78.5	21.0
Agency for Internat'l Dev	47.8	-	33.0	14.8	68.2	-	53.2	15.0	93.4	-	72.9	20.5
Dept of State	2.6	0.2	2.0	0.4	2.6	0.2	2.1	0.3	1.9	-	1.6	0.3
Arms Cont & Disarmament Ag	3.6	-	2.6	1.1	3.7	-	3.5	0.2	4.2	-	4.0	0.2
General science and basic research	1,050.2	962.1	82.8	5.3	1,128.2	1,033.8	86.4	7.9	1,247.5	1,148.1	90.4	9.0
National Science Foundation	748.7	678.0	65.4	5.3	818.9	741.0	70.0	7.9	910.1	828.3	72.8	9.0
Dept of Energy	301.5	284.1	17.4	-	309.3	292.8	16.4	-	337.4	319.8	17.6	-
Space research and technology (NASA)	3,481.2	411.6	539.6	2,530.0	3,943.6	454.8	583.6	2,905.2	4,050.5	550.8	621.3	2,878.4
Space flight	2,114.7	14.8	70.0	2,029.9	2,380.7	12.6	56.5	2,311.6	2,287.9	3.9	47.0	2,237.0
Space science, applications and technology	1,046.9	396.8	469.6	180.5	1,219.1	442.2	527.1	249.8	1,386.8	546.9	574.3	265.6
Supporting space activities	319.6	-	-	319.6	343.8	-	-	343.8	375.8	-	-	375.8

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and Development by Function and Agency
(dollars in millions)

Function and Agency	1978 Actual				1979 Estimates				1980 Estimates			
	Total	Basic	Applied	Development	Total	Basic	Applied	Development	Total	Basic	Applied	Development
Energy	3,134.4	157.2	633.2	2,344.0	3,485.3	178.1	735.0	2,572.3	3,428.6	228.7	753.0	2,447.0
Dept of Energy	2,867.1	157.2	425.8	2,284.1	3,213.0	178.1	485.5	2,549.5	3,143.5	228.7	487.9	2,427.0
Environmental Protection Ag	130.2	-	70.3	59.9	112.0	-	89.2	22.8	102.5	-	82.5	20.0
Nuclear Reg Commission	137.1	-	137.1	-	160.3	-	160.3	-	182.6	-	182.6	-
Natural resources and environment	898.4	207.0	472.3	219.1	994.3	231.2	555.1	208.0	1,054.0	237.6	613.3	203.1
Water resources	62.4	5.3	36.6	20.5	64.4	5.7	36.8	21.9	71.2	5.5	42.6	23.1
Bu of Reclamation (Interior)	11.2	0.1	10.5	0.6	11.1	0.1	10.5	0.5	11.7	0.1	11.1	0.5
Office of Water Research & Technology(Interior)	24.7	4.6	10.3	9.8	27.7	4.6	11.7	11.4	30.1	4.6	14.0	11.5
Corps of Engineers	26.5	0.6	15.8	10.1	25.6	1.0	14.6	10.0	29.4	0.8	17.5	11.1
Conservation and land management	109.5	31.1	73.3	5.1	119.1	32.9	80.5	5.7	111.7	30.8	73.3	7.6
Forest Service (DOA)	106.5	31.1	70.4	5.0	112.6	32.9	74.4	5.3	105.4	30.8	69.6	5.0
Bu Land Management (Int)	1.1	-	1.0	0.1	1.2	-	1.1	0.1	1.0	-	0.9	0.1
Office of Surface Mining & Reclamation (Int)	1.9	-	1.9	-	5.3	-	5.0	0.3	5.3	-	2.8	2.5
Recreational resources	38.9	14.4	18.4	6.1	44.7	17.1	20.3	7.3	47.3	16.5	23.2	7.6
Fish & Wildlife Sv (Int)	30.3	14.4	9.8	6.1	36.0	17.1	11.6	7.3	36.1	16.5	12.0	7.6
Nat'l Park Service (Int)	8.6	-	8.6	-	8.7	-	8.7	-	11.2	-	11.2	-
Pollution control & abatement	249.2	4.8	157.3	87.1	287.5	7.9	186.1	93.5	333.3	16.9	216.4	100.0
Environmental Protection Agency	249.2	4.8	157.3	87.1	287.5	7.9	186.1	93.5	333.3	16.9	216.4	100.0
Other natural resources	438.4	151.4	186.7	100.3	478.6	167.6	231.4	79.6	490.5	167.9	257.8	64.8
Office of the Sec (Int)	2.5	2.2	0.3	-	2.5	2.5	-	-	2.4	2.4	-	-
Geological Survey (Int)	157.8	126.1	31.7	-	172.9	138.0	34.9	-	172.8	137.3	35.5	-
Bu of Mines (Interior)	117.3	9.6	42.2	65.5	124.5	13.5	64.5	46.5	107.1	13.1	63.0	31.0
Nat'l Oceanic & Atmospheric Adm (Commerce)	160.8	13.5	112.5	34.8	178.7	13.6	132.0	33.1	208.2	15.1	159.3	33.8

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Budget Authority for Basic Research, Applied Research and Development by Function and Agency
(dollars in millions)

Function and Agency	1978 Actual				1979 Estimates				1980 Estimates			
	Total	Basic	Applied	Development	Total	Basic	Applied	Development	Total	Basic	Applied	Development
Agriculture	501.3	197.1	282.4	21.8	554.7	219.5	311.2	24.1	558.8	237.3	298.5	23.0
Science and Education Adm-Agricultural Res (DOA)	310.5	127.4	161.3	21.8	344.4	143.3	177.1	24.1	340.7	149.5	168.2	23.0
Science and Education Adm-Cooperative Res (DOA)	158.1	65.8	92.3	-	174.4	71.9	102.5	-	178.3	83.0	95.3	-
Economics, Statistics, and Cooperative Serv (DOA)	32.7	3.9	28.8	-	35.9	4.3	31.6	-	39.8	4.8	35.0	-
Commerce & housing credit	75.7	9.4	56.5	9.8	90.4	11.6	67.1	11.7	87.4	14.3	60.1	13.0
Bureau of Census (Commerce)	3.4	0.5	1.8	1.1	3.8	0.7	2.0	1.1	4.3	0.9	2.2	1.2
Nat'l Oceanic & Atmospheric Adm - Commercial Fisheries (Commerce)	11.3	-	11.3	-	11.3	-	11.3	-	-	-	-	-
Patent & Trademark Office (Commerce)	0.5	-	-	0.5	0.5	-	-	0.5	0.5	-	-	0.5
Nat'l Bureau of Standards (Commerce)	54.1	8.4	38.3	7.4	66.9	10.4	47.3	9.2	74.4	12.4	52.1	9.9
Nat'l Telecommunications & Info Adm (Commerce)	2.6	0.1	1.7	0.8	3.2	0.1	2.2	0.9	3.5	0.6	1.5	1.4
Federal Communications Comm	2.5	-	2.5	-	3.4	-	3.4	-	3.4	-	3.4	-
Federal Trade Comm	1.3	0.4	0.9	-	1.3	0.4	0.9	-	1.3	0.4	0.9	-
Transportation	767.2	69.6	394.2	303.4	821.5	77.7	449.4	294.4	862.1	81.4	478.9	301.8
Ground transportation	196.4	-	48.0	148.4	197.2	-	48.4	148.8	204.7	-	44.8	159.9
Fed Highway Adm (DOT)	43.4	-	4.3	39.1	46.0	-	4.8	41.2	46.8	-	4.7	42.1
Nat'l Highway Traffic & Safety Adm (DOT)	57.1	-	35.5	21.6	59.9	-	35.7	24.2	61.4	-	31.6	29.8
Fed Rail Adm (DOT)	41.8	-	7.1	34.7	40.8	-	6.9	33.9	44.4	-	7.5	36.9
Urban Mass Transportation Adm (DOT)	54.1	-	1.1	53.0	50.5	-	1.0	49.5	52.1	-	1.0	51.1
Air transportation	506.0	66.9	335.9	103.2	558.4	75.2	380.8	102.4	596.9	79.0	418.3	99.6
Fed Aviation Adm (DOT)	111.5	-	8.3	103.2	109.7	-	7.3	102.4	107.4	-	7.8	99.6
Aeronautical Research & Technology (NASA)	394.5	66.9	327.6	-	448.7	75.2	373.5	-	489.5	79.0	410.5	-

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and Development by Function and Agency
(dollars in millions)

Function and Agency	1978 Actual				1979 Estimates				1980 Estimates			
	Total	Basic	Applied	Development	Total	Basic	Applied	Development	Total	Basic	Applied	Development
Water transportation	38.9	2.7	6.3	29.9	38.0	2.5	9.9	25.6	38.3	2.4	10.9	25.0
Maritime Adm (Commerce)	19.6	2.7	4.3	12.6	18.7	2.5	4.2	12.0	17.3	2.4	3.7	11.2
Coast Guard (DOT)	19.3	-	2.0	17.3	19.3	-	5.7	13.6	21.0	-	7.2	13.8
Other transportation	25.9	-	4.0	21.9	27.9	-	10.3	17.6	22.2	-	4.9	17.3
Off of Sec (DOT)	25.0	-	3.9	21.1	16.4	-	5.5	10.9	11.5	-	0.5	11.0
Research & Special Programs Directorate (DOT)	0.9	-	0.1	0.8	11.5	-	4.8	6.7	10.7	-	4.4	6.3
Community & regional development	91.4	7.6	26.2	57.6	113.2	9.5	42.3	61.4	94.4	8.6	36.8	49.0
Community Development	75.6	3.7	19.1	52.8	88.2	5.1	30.5	52.6	70.6	3.1	23.9	43.6
National Fire Prevention & Control Adm (Commerce)	6.7	2.8	1.9	2.0	7.9	3.2	1.8	2.9	6.8	2.2	1.7	2.9
Economic Development Adm (Commerce)	17.7	0.9	1.7	15.1	23.7	1.9	3.6	18.2	12.8	0.9	1.6	10.3
Dept of Housing & Urban Development	51.2	-	15.5	35.7	56.6	-	25.1	31.5	51.0	-	20.6	30.4
Area & regional development	15.8	3.9	7.1	4.8	25.0	4.4	11.8	8.8	23.8	5.5	12.9	5.4
Tenn Valley Authority	15.8	3.9	7.1	4.8	25.0	4.4	11.8	8.8	23.8	5.5	12.9	5.4
Education, training, employment, & social services	343.5	57.2	103.7	182.6	345.4	63.2	104.5	177.7	350.5	66.6	108.2	175.7
Research and general education aids	169.4	53.1	38.4	77.9	167.8	59.0	37.0	71.8	175.9	62.7	41.2	72.0
Ass't Sec for Educ (HEW)	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-	1.0	-
Off of Educ (HEW)	43.5	-	21.1	22.4	37.0	-	15.2	21.8	41.3	-	18.1	23.2
Nat'l Inst of Educ (HEW)	90.1	18.3	16.3	55.5	92.5	21.7	20.8	50.0	94.3	23.4	22.1	48.8
Smithsonian Institution	34.8	34.8	-	-	37.3	37.3	-	-	39.3	39.3	-	-
Training & employment	87.4	1.2	12.8	73.4	81.3	1.3	12.0	68.0	81.3	1.3	12.0	68.0
Employment & Training Adm (Labor)	87.4	1.2	12.8	73.4	81.3	1.3	12.0	68.0	81.3	1.3	12.0	68.0

Budget Authority for Basic Research, Applied Research and Development by Function and Agency
(dollars in millions)

Function and Agency	1978 Actual				1979 Estimates				1980 Estimates			
	Total	Basic	Applied	Devel-opment	Total	Basic	Applied	Devel-opment	Total	Basic	Applied	Devel-opment
Other labor services	11.4	0.6	10.3	0.5	10.2	0.6	9.6	-	11.0	0.6	10.4	-
Asst Sec for Policy, Eval & Research (Labor)	3.5	-	3.5	-	2.1	-	2.1	-	2.5	-	2.5	-
Bu of International Labor Affairs (Labor)	0.9	-	0.9	-	0.9	-	0.9	-	0.9	-	0.9	-
Bu of Labor Stat (Labor)	1.6	-	1.1	0.5	0.8	-	0.8	-	0.8	-	0.8	-
Employment Standards Adm (Labor)	2.3	-	2.3	-	3.2	-	3.2	-	3.6	-	3.6	-
Labor Management Services Adm (Labor)	3.1	0.6	2.5	-	3.2	0.6	2.6	-	3.2	0.6	2.6	-
Social services	75.3	2.3	42.2	30.8	86.1	2.3	45.9	37.9	82.3	2.0	44.6	35.7
Human Development Services (HEW)	75.3	2.3	42.2	30.8	86.1	2.3	45.9	37.9	82.3	2.0	44.6	35.7
Health	2,967.7	1,245.6	1,333.4	388.8	3,387.3	1,532.9	1,438.7	415.8	3,444.4	1,548.4	1,486.1	409.9
Health research	2,908.6	1,245.6	1,278.4	384.7	3,319.5	1,532.9	1,375.6	411.1	3,374.8	1,548.4	1,420.5	405.9
National Institutes of Health (HEW)	2,575.8	1,156.0	1,047.3	372.5	2,956.4	1,428.6	1,129.0	398.8	2,958.2	1,435.3	1,128.4	394.5
Alcohol Drug Abuse & Mental Health Adm (HEW)	180.2	77.1	101.7	1.4	217.7	91.6	124.8	1.3	259.4	104.9	152.8	1.7
Center for Disease Control (HEW)	58.2	-	58.2	-	64.3	-	64.3	-	75.1	-	75.1	-
Health Care Financing Adm (HEW)	28.7	-	28.7	-	18.8	-	18.8	-	35.0	-	35.0	-
Health Services Adm (HEW)	15.4	0.6	7.6	7.2	15.6	0.6	7.8	7.2	11.1	0.4	4.2	6.5
Health Resources Adm(HEW)	5.0	-	5.0	-	1.1	-	1.1	-	-	-	-	-
Ass't Sec for Health(HEW)	33.9	3.3	27.0	3.6	34.2	3.5	26.9	3.8	29.5	2.9	23.4	3.2
Special Foreign Currency Program (HEW)	11.4	8.6	2.9	-	11.4	8.6	2.9	-	6.5	4.9	1.6	-
Consumer & occupational health & safety	59.1	-	55.0	4.1	67.8	-	63.1	4.7	69.6	-	65.6	4.0
Food & Drug Adm (HEW)	50.0	-	50.0	-	53.0	-	53.0	-	57.0	-	57.0	-
Occupational Health & Safety Adm (Labor)	4.3	-	4.3	-	6.3	-	6.3	-	6.5	-	6.5	-
Consumer Product Safety Commission	4.8	-	0.7	4.1	8.5	-	3.8	4.7	6.1	-	2.1	4.0

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Function and Agency	1978 Actual				1979 Estimates				1980 Estimates			
	Total	Basic	Applied	Development	Total	Basic	Applied	Development	Total	Basic	Applied	Development
Income security	43.0	1.5	38.7	2.9	41.2	1.5	35.5	4.3	43.5	1.2	37.8	4.4
Departmental Mgmt (HEW)	30.0	1.5	25.7	2.9	25.0	1.5	19.3	4.3	24.7	1.2	19.0	4.4
Social Security Adm (HEW)	13.0	-	13.0	-	16.2	-	16.2	-	18.8	-	18.8	-
Veterans benefits	111.1	9.1	87.0	15.0	122.8	9.6	97.0	16.2	122.8	10.1	95.3	17.4
Veterans Administration	111.1	9.1	87.0	15.0	122.8	9.6	97.0	16.2	122.8	10.1	95.3	17.4
Administration of justice	43.7	10.0	18.2	15.5	46.1	10.9	20.6	14.6	48.6	12.6	21.4	14.6
Federal Bureau of Investigation (Justice)	1.8	-	-	1.8	1.3	-	-	1.3	2.2	-	-	2.2
Immigration & Naturalization Service (Justice)	0.6	-	0.3	0.3	0.6	-	0.3	0.3	0.4	-	0.2	0.2
Drug Enforcement Administration (Justice)	3.3	-	1.0	2.3	2.3	-	0.7	1.6	1.8	-	1.8	-
Bu of Prisons (Justice)	3.4	-	0.6	2.8	3.5	-	1.3	2.2	2.9	-	0.9	2.0
Law Enforcement Assistance Adm (Justice)	28.5	8.0	15.9	4.6	32.5	9.2	18.0	5.3	34.5	10.6	18.3	5.6
General Administration (Justice)	2.0	2.0	-	-	1.7	1.7	-	-	2.0	2.0	-	-
Bu of Alcohol, Tobacco & Firearms (Treasury)	2.2	-	0.4	1.8	2.2	-	0.3	1.9	1.6	-	0.2	1.4
Customs Service (Treasury)	1.9	-	-	1.9	2.0	-	-	2.0	3.2	-	-	3.2
General government	17.6	-	7.1	10.4	18.4	-	7.5	10.8	19.5	-	8.1	11.3
Bu of Engraving & Printing (Treasury)	3.7	-	1.9	1.8	4.0	-	2.1	1.9	3.6	-	1.9	1.7
Internal Revenue Service (Treasury)	3.0	-	2.2	0.8	3.0	-	2.2	0.8	3.5	-	2.6	0.9
Off of Personnel Management	4.3	-	0.9	3.4	4.5	-	1.0	3.5	5.3	-	1.4	3.9
Advisory Comm on Intergovernmental Relations	1.7	-	1.7	-	1.8	-	1.8	-	1.8	-	1.8	-
Library of Congress	4.9	-	0.4	4.4	5.1	-	0.4	4.6	5.3	-	0.4	4.8

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